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L3: Entry 1 of 1 File: USPT Oct 16, 2001

DOCUMENT-IDENTIFIER: US 6303161 B1
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TITLE: Product containing healthful component and process for preparing the same

Brief Summary Text (5):
The isoflavone compounds are represented by the following formula and Denotative Table. ##STR1##

Brief Summary Text (6):
Of these isoflavone compounds, daidzein is an aglycone of daidzin having its glucose as a glycosidic saccharide hydrolytically separated therefrom, and genistein is an aglycone of genistin having its glucose as a glycosidic saccharide hydrolytically separated therefrom. With respect to the isoflavone compounds, contents thereof and percentages between daidzin and daidzein and between genistin and genistein in a defatted soybean are shown in the following Table 1.

Brief Summary Text (7):
It is understood from Table 1 that, in soybeans, daidzin and genistin are contained in large amounts while daidzein and genistein which are aglycones thereof are contained in smaller amounts.

Brief Summary Text (21):
With respect to a soybean miso (mame miso), a rice miso (kome miso), Daitokuji Soy nuggets (Daitokuji-natto: a Japanese fermented soy-food in the form of nuggets), dried-frozen tofu (Kori-tofu-tofu: a Japanese food made of soy milk curds) and yuba (yuba: a Japanese food made of a film which forms on a surface of thick soy milk when the soy milk is gently heated) as commercially available foods made from a pulse crop as a starting material, contents of daidzin and daidzein and contents of genistin and genistein were comparatively measured. The results are as shown in the following Table 2.

Brief Summary Text (22):
It is understood from Table 2 that in the soybean miso, the rice miso and the Daitokuji-natto each of which has been subjected to fermentation treatment, daidzin and genistin have substantially been hydrolyzed, and in particular, the soybean miso and the Daitokuji-natto contain daidzein and genistein which are aglycones of daidzin and genistin in large amounts. However, soybean miso and Daitokuji-natto should not be ingested in large amounts because of their high salt contents. It is also understood that in the dried-frozen tofu, each of daidzin, daidzein, genistin and genistein is contained in a small amount. It is further understood that similarly to the defatted soybean described above, the yuba contains daidzin and genistin in large amounts and daidzein and genistein which are aglycones thereof in small amounts.

Brief Summary Text (24):
With respect to a soybean miso (mame miso), a rice miso (kome miso), Daitokuji Soy nuggets (Daitokuji-natto: a Japanese fermented soy-food in the form of nuggets), dried-frozen tofu (Kori-tofu, tofu: a Japanese food made of soy milk curds) and yuba (yuba: a Japanese food made of a film which forms on a surface of thick soy milk when the soy milk is gently heated) as commercially available foods made from

a pulse crop as a starting material, phytic acid contents were measured. The results are as shown in Table 3 below.

Brief Summary Text (25):
It is seen from this Table 3 that phytic acid is almost completely broken down in soybean miso, rice miso and Daitokuji natto, which are subjected to fermentation treatments. However, soybean miso, rice miso and Daitokuji natto have high salt concentrations, and cannot be eaten in large amounts. Furthermore, it is seen that the phytic acid content is large in the case of frozen tofu and dried tofu, so that myo-inositol cannot be digested and absorbed.

Brief Summary Text (32):
In order to accomplish the object, the product of the present invention containing the health-promoting component claimed in claim 1 is characterized in that: the product contains a health-promoting component produced by inoculating koji mold on a pulse crop to effect koji preparation, and then hydrolyzing the products produced by this koji preparation treatment, and the product contains a health-promoting component consisting of intestine-regulating bacteria added to the beans and grown during the period extending from the inoculation of the koji mold to the completion of the hydrolysis.

Brief Summary Text (33):
Furthermore, the process of the present invention for preparing a product that contains the health-promoting component claimed in claim 6 is characterized in that: the health-promoting component is produced by inoculating koji mold on a pulse crop to effect koji preparation, and then hydrolyzing (through the addition of water) the products produced by this koji preparation treatment, and the product that contains the health-promoting component is produced by adding intestine-regulating bacteria which constitute a health-promoting component to the beans and growing the bacteria during the period extending from the inoculation of the koji mold to the completion of the hydrolysis.

Brief Summary Paragraph Table (1):
Denotative Table R1 R2 daidzin H glucose daidzein H H genistin OH glucose genistein OH H

Brief Summary Paragraph Table (2):
TABLE 1 daidzin daidzein genistin genistein defatted 100 3.2 180 4.2 soybean (96.9%) (3.1%) (97.7%) (2.3&) (unit: mg/100 g)

Brief Summary Paragraph Table (3):
TABLE 2 unit: mg/100 g daidzin daidzein genistin genistein soybean miso not detected 78 not detected 57 rice miso 0.66 21 2.3 20 Daitokuji-natto not detected 49 not detected 42 dried-frozen tofu 0.95 8.4 8.0 11 yuba 110 24 160 17 (detection limit: 0.5 mg/100 g)

Brief Summary Paragraph Table (4):
TABLE 3 Units: mg/100 g Phytic Acid Soybean miso Not detected Rice miso Not detected Daitokuji natto Not detected Dried-frozen tofu 506 Yuba 361 Detection limit: 5 mg/100 g

Detailed Description Text (22):
Table 4 shows the contents of isoflavone compounds in 100 g of soybean meal in a case where untreated soybean meal were subjected to koji preparation for 48 hours at an initial temperature of 30.degree. C., after which an amount of water equal to the weight of the product was added, and protein hydrolysis was performed for an additional 24 hours at 30.degree. C.

Detailed Description Text (23):
According to this Table 4, the amounts of daidzein and genistein, which are

aglycones of isoflavone compounds, were 74 mg and 59 mg, values that were respectively approximately 23 times and 14 times the values seen in the conventional example shown in FIG. 1; thus, the amounts of these compounds were greatly increased. It is seen from this that the amounts of daidzein and genistein produced can be further increased by performing hydrolysis for 24 hours or longer following the completion of koji preparation.

Detailed Description Text (24):
With the same object as Table 4, Table 5 shows the values before treatment and after treatment for other embodiments in which the treatment of the process of the present invention was performed on untreated soybean meal and separated soybean protein.

Detailed Description Text (25):
Describing the soybean meal first, the ratio of koji mold to raw material was selected so that 0.1 g of crudely refined white rice containing koji mold spores at the rate of 8.times.10.sup.7 spores/g was added to 100 g of soybean meal constituting the raw material. Using this ratio of koji mold to raw material, untreated soybean meal was subjected to koji preparation for 48 hours at an initial temperature of 30.degree. C.; then, an amount of water equal to the weight of the product was added, and protein hydrolysis was performed for an additional 48 hours at 50.degree. C. The results obtained were as shown in Table 5.

Detailed Description Text (26):
Meanwhile, the above-described commercially marketed soybean protein used was FUJINIC 200 (commercial name) manufactured by Fuji Purina Protein Kabushiki Kaisha. In this case, the ratio of koji mold to raw material was selected so that 0.1 g of crudely refined white rice containing koji mold spores at the rate of 8.times.10.sup.7 spores/g was added to 100 g of commercially marketed soybean protein constituting the raw material. Using this ratio of koji mold to raw material, untreated commercially marketed soybean protein was subjected to koji preparation for 48 hours at an initial temperature of 30.degree. C.; then, an amount of water equal to the weight of the product was added, and protein hydrolysis was performed for an additional 48 hours at 50.degree. C. The results obtained were as shown in Table 5.

Detailed Description Text (27):
According to this Table 5, the amounts of daidzein and genistein, which are aglycones of isoflavone compounds, in the case of soybean meal, were 70 mg and 64 mg, which were respectively approximately 22 times and 15 times the values measured prior to treatment; thus, the amounts of these compounds were greatly increased. Furthermore, daidzin, which is an isoflavone compound with glycosides, was decomposed until it could no longer be detected, and genistin was also greatly diminished to a value of 1.3 mg.

Detailed Description Text (38):
Table 6 shows the phytic acid content in 100 g of soybean meal for untreated soybean meal, soybean meal A and B which were subjected to koji preparation for 48 hours at an initial temperature of 30.degree. C. using two types of shochu malt (Aspergillus niger and Aspergillus awamori), and which were then subjected to hydrolysis for an additional 24 hours at 30.degree. C. following the addition of an equal weight of water to the respective products, and soybean meal which was subjected to a conventional alcohol cleaning treatment.

Detailed Description Text (39):
According to this Table 6, the phytic acid content in untreated soybean meal was 999 mg, or approximately 1%, while the phytic acid contents of soybean meal A and B, which were subjected to a shochu malt treatment according to the process of the present invention, and which were then subjected to protein hydrolysis for an additional 24 hours at 30.degree. C. following the addition of an equal weight of

water to the respective products, were diminished to a point where said phytic acid contents could not be detected, i. e., to a point where all of the phytic acid was decomposed.

Detailed Description Text (44):
To describe this further, using defatted soybeans as a raw material, miso koji mold (Aspergillus oryzae) and lactic acid bacteria (Lactococcus lactis subsp. lactis) were mixed with the soybeans in such proportions that 0.1 g of crudely refined white rice containing koji mold spores of the miso koji mold at the rate of 8.times.10.sup.7 spores/g was added to 100 g of the raw-material defatted soybeans, and the number of lactic acid bacteria added was on the order of 10.sup.3 colony forming unit (cfu)/g. Then, koji preparation was performed for 48 hours at an initial temperature of 30.degree. C., and protein hydrolysis was performed for an additional 41 hours at 50.degree. C. following the addition of an equal weight of water to the product. In this case, the number of lactic acid bacteria in respective products dried by a hot air draft immediately after the completion of koji preparation (koji product), and following 13 hours, 24 hours, 30 hours and 41 hours of hydrolysis, was investigated. Furthermore, 0.1 g of each of the products was added to 100 ml of milk and separately to 100 ml of a suspension prepared by dissolving 16 g of commercially marketed skim milk in 140 ml of water, and the pH was investigated immediately after addition and after 18 hours at 40.degree. C. The results obtained are shown in Table 7.

Detailed Description Text (45):
According to this Table 7, the lactic acid bacteria were greatly increased from the order of 10.sup.3 colony forming unit (cfu)/g to the order of 10.sup.7 colony forming unit (cfu)/g in the koji preparation step and were further greatly increased to the order of 10.sup.9 colony forming unit (cfu)/g in the subsequent hydrolysis process. Furthermore, it is also seen that the compatibility of the miso koji mold (Aspergillus oryzae) and the lactic acid bacteria (Lactococcus lactis subsp. lactis) is good. Moreover, since no ventilation was performed in the hydrolysis process, even the anaerobic lactic acid bacteria showed considerable growth. When this concentration on the order of 10.sup.9 colony forming unit (cfu)/g was reached, no undesirable organisms recognized at the time of completion of the koji preparation step could be confirmed. The amount of lactic acid following hydrolysis was increased to a sufficient number; furthermore, it may be said that the propagation of undesirable aerobic organisms was reliably suppressed in the environment that was present during hydrolysis, and that the propagation of undesirable organisms was also reliably suppressed as a result of the action shown by Lactococcus lactis subsp. lactis in producing bacteriocin (see Gross, E. and Morell, J. L.: J. Am. Chem. Soc., 93, 4634-4635 (1971)). Furthermore, in the milk and skim milk suspensions containing 0.1 g of the respective samples, the pH was caused to drop from approximately 6.5 to approximately 4.5 after 18 hours had passed (at 40.degree. C.) from the time of addition; thus, it is seen that the lactic acid bacteria showed further active propagation.

Detailed Description Text (63):
The respective feeds used were the base feed (control group) shown in Table 8 below, which was used as a feed for suckling piglets, a feed (test group) prepared by adding fermented defatted soybeans prepared by the process of the present invention to the base feed at a rate of 4%, and a feed (comparative group) prepared by adding plasma protein to the same base feed at a rate of 1.8%, with the crude protein contents being adjusted so that said contents were equal.

Detailed Description Text (67):
Inside a concrete pig shed with a natural ventilation system, the animals of the control group, test group and comparative group were placed in 190 cm.times.125 cm.times.75 cm all-drain board cages, with 6 animals to each cage so that the body weights were equal. Each group was raised for two weeks with free feeding and watering allowed. Each week, the body weights of the animals and the amounts of

feed ingested were measured, and the body weight increase and feed requirements were determined from these values. The results are shown in Table 9. The health conditions of the piglets were also observed daily.

Detailed Description Text (68):
There was no diarrhea in any of the groups, and no deficiencies in body tone appeared. As shown in Table 9, the weight increase in the period from 0 to 14 days, during which the health conditions of the piglets appeared normal, was 25% higher in the test group than in the control group. This tendency appeared in the first week following the initiation of testing, with the increase in body weight during the period of 0 to 7 days being 37% higher in the test group than in the control group. However, this difference was not significant. The weight increase during the period of 7 to 14 days was 17% higher in the test group than in the control group, and this difference was significant ($p<0.05$). In the comparative group in which plasma protein was added, the weight increase during the period of 0 to 14 days was only 4% higher than in the control group, so that no great effect was observed. Since no great increase in body weight was observed even in the case of a feed prepared by adding ordinary untreated defatted soybeans to the base feed, the results suggested that fermented defatted soybeans manufactured by the process of the present invention did not constitute a minus factor in terms of digestive absorption in young single-stomached animals such as piglets, etc., but rather showed a large plus factor, i. e., the presence of an intestine-regulating action.

Detailed Description Text (72):
Male mice of std:ddy at an age of 4 weeks and with a body weight of approximately 20 g (according to Nippon SLC) were raised for 7 days on a commercially marketed solid feed (MF manufactured by Oriental Kobo (yeast) Kabushiki Kaisha) in order to acclimatize the animals to the raising environment. Afterward, the animals were divided into three groups as shown in Table 10 below, i. e., a casein group (8 animals) using casein as a feed, a fermented defatted soybean group (8 animals) using fermented defatted soybeans manufactured by the process of the present invention as a feed, and an untreated defatted soybean group (8 animals) using unfermented defatted soybeans as a feed. These animals were raised for 4 weeks; on the final day of raising, the animals were killed by decapitation, and the livers were excised.

Detailed Description Text (79):
As shown in Table 11 below, the measurement results were as follows: i. e., the amount of cytochrome P-450 was significantly lowest in the casein feed group. When the fermented defatted soybean group and the untreated defatted soybean group were compared, an increase in the amount of cytochrome P-450 was observed in the fermented defatted soybean group. It can be seen that this probably suggests that the amount of cytochrome P-450 in a dose-dependent manner with isoflavone aglycones. In other words, if the three test feeds are compared, it is seen that the fermented defatted soybeans manufactured by the process of the present invention cause the greatest increase (with a significant difference) in the amount of cytochrome P-450 (which is a hepatic drug metabolizing enzyme). Furthermore, cytochrome P-450 II also contributes to the promotion of metabolism in Practical Examples 3 and 4 described below; thus, it can be seen that fermented defatted soybean manufactured by the process of the present invention cause a significant increase in the promotion of metabolism.

Detailed Description Text (83):
Using 15 ddy male mice with a body weight of approximately 20 g in each test group, the unfermented defatted soybean feed and the fermented defatted soybean feed which was manufactured by the process of the present invention, both shown in Table 12 below, were given to the mice for four weeks. Afterward, a 5% acetaldehyde suspension (suspended in distilled water) was injected into the abdominal cavity of each animal at the rate of 10 ml per kg of body weight. The time in a coma (from the onset of coma to re-awakening) was then measured.

Detailed Description Text (84):
As shown in Table 13 below, the measurement results indicate that the coma time was long, i. e., approximately 96 minutes, in the case of the group receiving the unfermented defatted soybean feed; on the other hand, the coma time was approximately 71 minutes, shortened by approximately 25 minutes, in the case of the group receiving the fermented defatted soybean feed manufactured by the process of the present invention. Thus, the product of the present invention can accelerate the rate of acetaldehyde metabolism and is thus able to prevent hangovers and deleterious after-effects of alcohol, and to strengthen hepatic function.

Detailed Description Text (88):
Using 14 ddy male mice with a body weight of approximately 20 g in each group, the feeds shown in Table 14 below, i. e., an unfermented defatted soybean feed, a fermented defatted soybean feed manufactured by the process of the present invention, casein, egg white and gluten, were given to the mice for four weeks. Afterward, a 10% acetaldehyde suspension (suspended in distilled water) was injected into the abdominal cavity of each animal at the rate of 10 ml per kg of body weight, and the survival rate was measured.

Detailed Description Text (98):
The measurement results were as shown in Table 15 above. The suppression rate following hydrolysis tended to be highest; and it appears from this that Maillard reaction products were produced by hydrolysis. Thus, in the present invention, a Maillard reaction occurs in the same manner as in miso; and there is no addition of salt as there is in miso or soy sauce. Accordingly, the hydrolysis time following koji preparation can be greatly shortened.

Detailed Description Paragraph Table (1):
TABLE 4 Daidzin Daidzein Genistin Genistein 25 74 531 59 (Units: mg/100 g)

Detailed Description Paragraph Table (2):
TABLE 5 Commercially marketed soybean Soybean meal protein Before After Before After Daidzin 100 Not detected 90 1.0 Daidzein 3.2 70 5.3 100 Genistin 120 1.3 120 3.3 Genistein 4.2 64 4.4 94 (Units: mg/100 g)

Detailed Description Paragraph Table (3):
TABLE 6 Object soybean meal Phytic acid content (mg/100 g) Untreated soybean meal 999 (mg/100 g) Shochu malt treatment A Not detected Shochu malt treatment B Not detected Alcohol-cleaned soybean meal 1150 (mg/100 g) (Detection limit: 5 mg/100 g)

Detailed Description Paragraph Table (4):
TABLE 7 Number of Milk Defatted powdered milk lactic acid After 0 After 18 After 0 After 18 bacteria hours hours hours hours Koji product (1.2 .times. 6.77 4.73 6.65 4.80 10.sup.7) After 13 hours 3.4 .times. 10.sup.9 6.78 4.54 6.63 4.54 of hydrolysis After 24 hours 2.9 .times. 10.sup.9 6.77 4.54 6.64 4.57 of hydrolysis After 30 hours 3.1 .times. 10.sup.9 6.76 4.55 6.63 4.54 of hydrolysis After 41 hours 2.2 .times. 10.sup.9 6.76 4.52 6.63 4.55 of hydrolysis

Detailed Description Paragraph Table (5):
TABLE 8 Indicated components of base feed and names of raw materials, etc. Feed for suckling piglets (used during artificial suckling of Type of feed piglets) Indicated components Crude protein 22.0% or greater Crude fat 3.0% or greater Crude fiber 2.0% or less Crude ash content 6.5% or less Calcium 0.65% or greater Phosphorus 0.50% or greater TDN 84.0% or greater DCP 20.0% or greater Names of raw materials, etc. Classification of raw materials Amount added Name of raw material.sup.1) Grains 46% Powdered wheat, bread crumbs, dextrin, (soy- bean flour).sup.2) Feeds consisting of animal 32% Skim milk, fish meal, substances (dried whey) Vegetable oils and lees 3% Concentrated soybean protein, potato

protein Other 19% Sugar, glucose, animal oils, plasma protein, bread yeast, calcium phosphate, bacillus toyoi bacteria, fructooligo- saccharides, silicic acid, citric acid, tartaric acid, lactic acid, malic acid, (calcium carbonate), (betaine), (salt) Feed additives Avilamycin (good's name) 40 g potency/ton Morantel citrate 30 g/ton Colistin sulfate 40 g potency/ton Notes) .sup.1) Raw material names are listed substantially in the order of amount added .sup.2) Raw materials shown in parentheses may be omitted in some cases depending on the raw material conditions, etc.

Detailed Description Paragraph Table (6):
TABLE 9 Body weight, weight increase, amount of feed ingested and feed requirements. Comparative Numbers of Control group group Test group animals 6 6 4 Body weight (kg) After 0 days 8.3 .+-. 0.8 (100) 8.3 .+-. 0.9 (100) 8.2 .+-. 0.8 (98) After 7 days 10.2 .+-. 1.3 (100) 10.4 .+-. 1.2 (103) 10.7 .+-. 0.9 (105) After 14 days 14.3 .+-. 1.7 (100) 14.5 .+-. 1.5 (102) 15.5 .+-. 1.0 (109) Increase in body weight (g/day/animal) After 0 to 267 .+-. 102 (100) 300 .+-. 131 (112) 365 .+-. 88 (137) 7 days After 7 to 587 .+-. 73 (100) 586 .+-. 68 (100) 688 .+-. 21 (117) 14 days After 0 to 427 .+-. 86 (100) 443 .+-. 91 (104) 526 .+-. 42 (125) 14 days Amount of feed ingested (g/day/animal) After 0 to 366 (100) 376 (103) 398 (109) 7 days After 7 to 742 (100) 851 (115) 991 (134) 14 days After 0 to 554 (100) 613 (111) 679 (123) 14 days Feed requirement After 0 to 1.37 (100) 1.25 (92) 1.09 (80) 7 days After 7 to 1.26 (100) 1.45 (115) 1.44 (114) 14 days After 0 to 1.30 (100) 1.39 (107) 1.29 (99) 14 days Notes) -Mean value .+-. standard deviation (n - 1) -Numerals in parentheses are indices with the value for the control group taken as 100.

Detailed Description Paragraph Table (7):
TABLE 10 Compositions of test feeds. Fermented Untreated Casein defatted defatted Component (g/kg) soybeans (g/kg) soybeans (g/kg) Casein 200 -- -- Fermented defatted -- 325 -- soybeans Untreated defatted soybeans -- -- 365 Mineral mixture 35 35 35 Vitamin mixture 10 10 10 Corn oil 50 50 50 Soybean fiber 16 -- 8 Sucrose 200 200 200 .alpha.-cone starch 489 380 332

Detailed Description Paragraph Table (8):
TABLE 11 Effects of fermented defatted soybeans on microsome protein levels and cytochrome P-450 level in hepatic microsomes. Microsome protein Feed Liver weight (g) (mg/g liver) Casein 2.07 .+-. 0.08.sup.b 23.0 .+-. 1.0.sup.a Fermented defatted soybeans 1.99 .+-. 0.11.sup.ab 25.2 .+-. 1.1.sup.a Untreated defatted soybeans 1.78 .+-. 0.08.sup.a 26.1 .+-. 2.1.sup.a Cytochrome P-450 Cytochrome P-450 Feed (nmol/mg protein) (nmol/g liver) Casein 0.42 .+-. 0.04.sup.a 9.7 .+-. 1.2.sup.a Fermented defatted soybeans 0.92 .+-. 0.05.sup.c 23.4 .+-. 2.1.sup.c Untreated defatted soybeans 0.65 .+-. 0.03.sup.b 17.1 .+-. 1.8.sup.b Notes) -Mean value .+-. standard deviation (n = 8) -Mean values in vertical rows which do not have the same characters show significant differences ($P < 0.05$) -Testing for significant differences was accomplished by Duncan's multiple range test.

Detailed Description Paragraph Table (9):
TABLE 12 Experimental feeds Unfermented defatted Fermented defatted soybean soybean feed (g/kg) feed (g/kg) Unfermented 402 -- defatted soybean feed Fermented defatted -- 359 soybean feed Corn oil 50 50 Vitamin mixture 10 10 Mineral mixture 35 35 Cellulose 12 -- .alpha.corn starch 291 346 Sucrose 200 200

Detailed Description Paragraph Table (10):
TABLE 13 Effect on coma time caused by acetaldehyde administration Coma time (minutes) Unfermented defatted soybean feed (n = 15) 96 .+-. 9.sup.a Fermented defatted soybean feed (n = 15) 71 .+-. 7.sup.b

Detailed Description Paragraph Table (11):
TABLE 14 Protein source in feed (survival rate) Fermented Untreated defatted defatted soybeans soybeans Casein Egg white Gluten Same day 11/14 10/14 8/14 5/14

2/14 (79%) (71%) (57%) (36%) (14%) First day 11/14 9/14 8/14 5/14 0/14 (79%) (64%) (57%) (36%) (0%) Second day 8/14 6/14 7/14 4/14 0/14 (57%) (43%) (50%) (29%) (0%) Third day 8/14 4/14 7/14 3/14 0/14 (57%) (29%) (50%) (21%) (0%) Fourth day 6/14 3/14 5/14 3/14 0/14 (43%) (21%) (36%) (21%) (0%) Fifth day 6/14 3/14 4/14 3/14 0/14 (43%) (21%) (29%) (21%) (0%)

Detailed Description Paragraph Table (12):
TABLE 15 Suppression rate (%) Whole soybeans Untreated 22.5 Following koji preparation 15.2 (product dried by hot air draft) Following hydrolysis 60.2 (product dried by hot air draft) Defatted Untreated 0.8 soybeans Following koji preparation 24.5 (product dried by hot air draft) Following hydrolysis 34.7 (product dried by hot air draft)

CLAIMS:

1. A product containing a health-promoting component, said product consists of: a health-promoting component produced by inoculating koji mold on a pulse crop to effect koji preparation, and then hydrolyzing products produced by said koji preparation treatment; and a health-promoting component consisting of bacteria which have an intestine-regulating effect in single-stomached animals and are added to said pulse crop and grown during a period extending from an inoculation of said koji mold to a completion of said hydrolysis.

PALM Intranet

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